# E-9 TEMPORARY SLOPE DRAINS

## *PURPOSE & APPLICATIONS*

A slope drain is a flexible tubing or conduit extending from the top to the bottom of a cut or fill slope. Its purpose is to temporarily conduct runoff safely down the disturbed face of an embankment without causing erosion. It significantly reduces rill and gully erosion on slopes during construction.

## *CONSIDERATIONS*

There is often a significant time lag between when a cut or fill slope is completed and when a permanent drainage system can be installed and during this period, the slope is usually particularly vulnerable to erosion. The maximum drainage area per drain should be relatively small and much less than 5 acres.

When used in conjunction with diversion dikes, temporary slope drains can be used to convey stormwater from the entire drainage area above a slope to the base of the slope without erosion. It is very important that these temporary structures be installed properly since their failure will often result in severe gully erosion. The conduit inlet section must be securely entrenched, all connections must be watertight, and the conduit must be staked securely.

## *SPECIFICATIONS*

**Design Criteria**

Refer to the detail drawings located at the back of this section for the proper design of a temporary slope drain.

- The slope drain shall consist of heavy-duty flexible material designed for this purpose. The diameter of the slope drain shall be equal over its entire length. Reinforced hold-down grommets must be spaced at 10 foot (or less) intervals.
- Slope drains shall be sized according to the following table:

| Drainage Area (Acres) | Pipe Diameter, D (Inches) |
|---|---|
| 0.5 | 12 |
| 1.5 | 18 |
| 2.5 | 21 |
| 3.5 | 24 |
| 5.0 | 30 |

- The entrance to the slope drain shall consist of a standard MDOT Flared End-Section for Metal Pipe Culverts. Extension collars shall consist of 12-inch long corrugated metal pipe. Watertight fittings shall be provided.
- An earthen dike shall be used to direct stormwater runoff into the temporary slope drain and shall be constructed according to the WATER DIVERSION BMP.
- The height of the dike at the centerline of the inlet shall be equal to the diameter of the pipe (D) plus 6 inches. Where the dike height is greater than 18 inches at the inlet, it shall be sloped at the rate of 3:1 or flatter to connect with the remainder of the dike.
- The outlet of the slope drain shall be protected from erosion according to the PIPE OUTLET PROTECTION BMP.

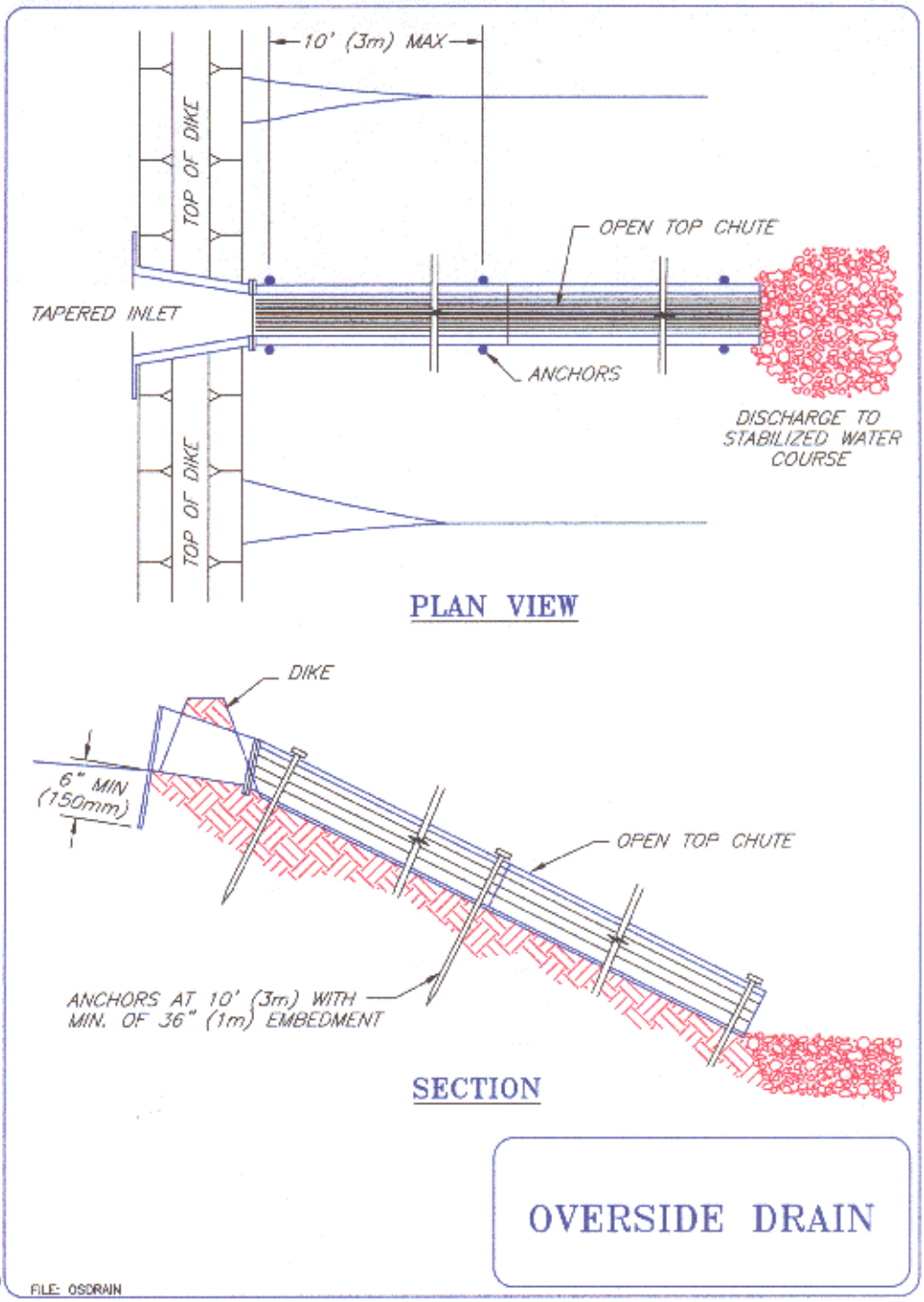
**Construction Specifications**

- The temporary slope drain shall be placed on undisturbed soil or well-compacted fill.
- The entrance section shall slope toward the slope drain at the minimum rate of 1/2 inch per foot.

- The soil around and under the entrance section shall be hand-tamped in 8 inch lifts to the top of the dike to prevent piping failure around the inlet.
- The slope drain shall be securely staked to the slope at the grommets provided.
- The slope drain sections shall be securely fastened together and have watertight fittings.
- Installation of temporary slope drains should be completed and their outlets protected before runoff is diverted to them.

## *MAINTENANCE*

The slope drain structure shall be inspected weekly, and after every storm and repairs shall be made as necessary. The entrance should be kept clear of sediment and debris. The contractor should avoid the placement of any material on and prevent construction traffic across the slope. Upon stabilization of the slope, the slope drain shall be removed.


10' (3m) MAX
TOP OF DIKE
OPEN TOP CHUTE
TAPERED INLET
ANCHORS
DISCHARGE TO STABILIZED WATER COURSE
TOP OF DIKE
PLAN VIEW
DIKE
6" MIN (150mm)
OPEN TOP CHUTE
ANCHORS AT 10' (3m) WITH MIN. OF 36" (1m) EMBEDMENT
SECTION
OVERSIDE DRAIN
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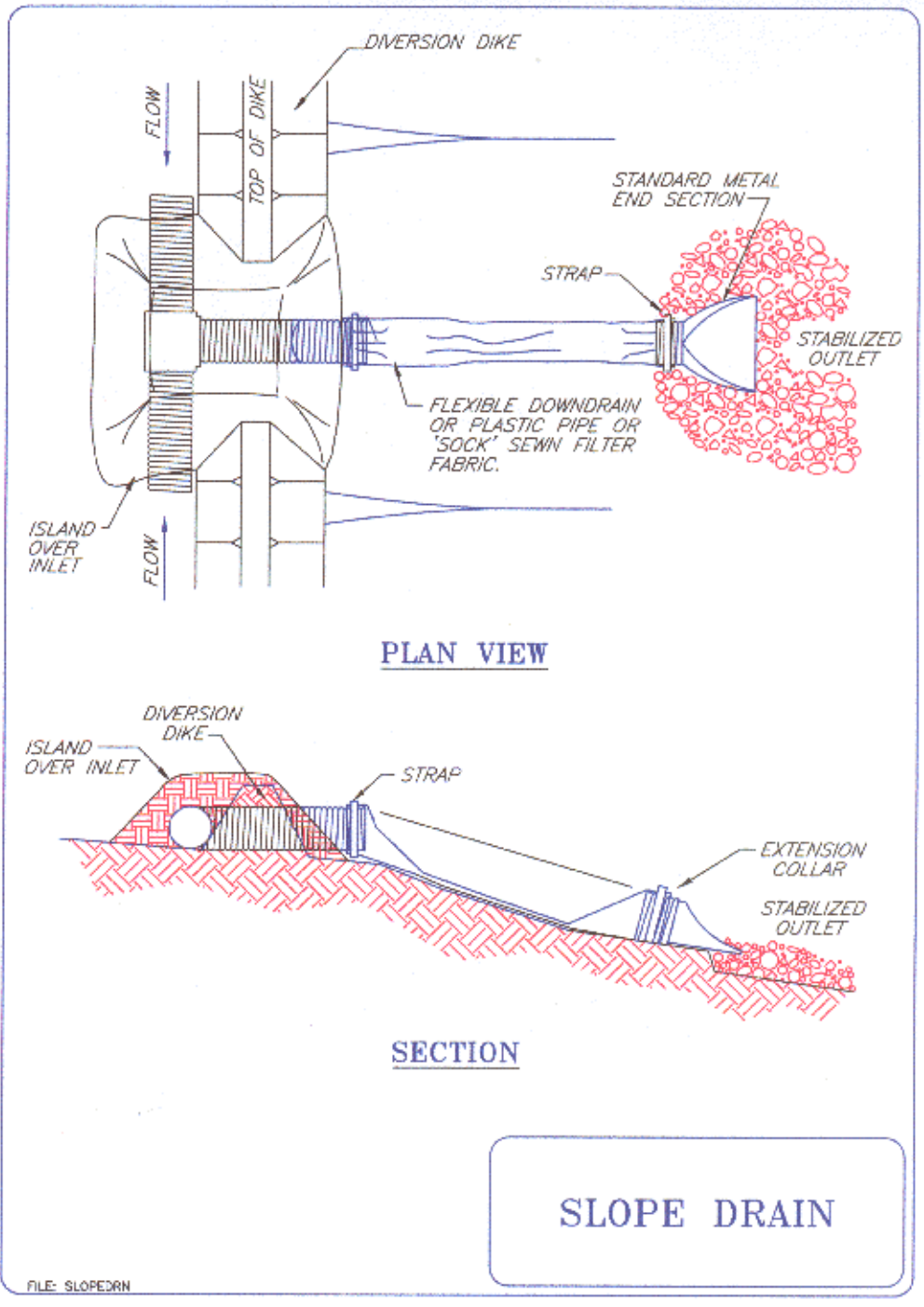
FILE: OSDRAIN


DIVERSION DIKE
FLOW
TOP OF DIKE
STANDARD METAL END SECTION
STRAP
STABILIZED OUTLET
FLEXIBLE DOWNDRAIN OR PLASTIC PIPE OR 'SOCK' SEWN FILTER FABRIC.
ISLAND OVER INLET
FLOW
PLAN VIEW
DIVERSION DIKE
ISLAND OVER INLET
STRAP
EXTENSION COLLAR
STABILIZED OUTLET
SECTION
SLOPE DRAIN
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